Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

TITLE V / SYNTHETIC MINOR (DRAFT) NO. V-05-034
BLUEGRASS CHEMICAL AGENT-DESTRUCTION PILOT PLANT
2091 KINGSTON HIGHWAY, RICHMOND KY.
JULY 28, 2005
D. BRIAN BALLARD, REVIEWER
PLANT I.D. # 021-151-00013
AGENCY INTEREST # 2805
ACTIVITY I.D. # APE20040006

SOURCE DESCRIPTION:

On September 20, 2004 The Kentucky Division for Air Quality (KYDAQ) received an air permit application for a 40 CFR Part 70 (Title V), Clean Air Act (CAA) permit for existing emission sources such as boilers and paint spray booths, as well as other processes normally found in heavy equipment refurbishing and repair operations from The Blue Grass Army Depot (BGAD). On the same date (September 20, 2004), KYDAQ received an air permit application for the addition of new facilities associated with the chemical agent-destruction pilot plant, which is referred to as the Blue Grass Chemical Agent-Destruction Pilot Plant (BGCAPP).

The affected facilities contained in the applications are a major source as defined in Title V of the CAA. On July 6, 2005 KYDAQ issued permit number V-05-020, which authorizes the operation of existing emission sources at BGAD and the construction of some new emissions sources. Per the guidance in the U.S. Environmental Protection Agency Title V guidance memorandum, "Major Source Determinations for Military Installations under the Air Toxics, New Source Review, and Title V Operating Permit Programs of the Clean Air Act," dated August 2, 1996, and at the request of BGAD, the KYDAQ will issue a separate stand-alone Title V permit for the BGCAPP, permit number V-05-034.

The BGCAPP is located wholly within the BGAD's boundary. The sole function of the BGCAPP is the destruction of the chemical weapons stockpile stored at the BGAD. All chemical weapons and chemical agent (CA)-contaminated materials will be processed and all CA will be neutralized in the munitions demilitarization building (MDB), emission unit CD01, in permit number V-05-034. The products of CA neutralization (hydrolysate) are stored in the hydrolysate storage tanks, insignificant activities 2 and 3 in permit number V-05-034. The hydrolysate will then be treated in the supercritical water oxidation (SCWO) process building (SPB), where it is converted into an inorganic filter cake and high purity water that will be reused in the plant. The waste treatment residues will be shipped offsite for disposal or recycling.

SOURCE DESCRIPTION (CONTINUED):

Emission Unit CD01 is the Munitions Demilitarization Building (MDB). The MDB contains the following process equipment:

Rocket Demilitarization: Equipment includes nine (9) gallon/minute water jet pump and spare, two (2) rocket shear machine (RSM) lines, which include the following equipment per line: RSM/projectile mortar disassembly (PMD) input blast gate, energetics batch hydrolyzer (EBH) blast airlock assembly, ten (10) gallon/minute working capacity drained agent surge drum, two (2) gallon/minute drained agent pump, rocket handling robot, drained agent washout spare pump, four and one-half (4.5) gallon/minute agent washout pump and twenty (20) gallon/minute working capacity agent washout surge drum. The rockets are disassembled in the RSM. The RSM accesses the agent cavity, drains the agent into an agent collection tank and washes the agent cavity with high-pressure water. Additionally, the RSM cuts the warhead and the motor sections of the rocket into small pieces for treatment in the energetics batch hydrolyzers (EBH). The agent is neutralized in the Agent Neutralization System (ANS).

Projectile Demilitarization: Equipment includes RSM/PMD input blast gate, EBH blast airlock assembly, projectile discharge blast gate, projectile mortar disassembly (PMD) machine, PMD projectile transfer robot and rocket handling robot. Nose closures and bursters are removed from the 155-mm H projectiles by the PMD. After removal of the nose closure and burster, a conveyor moves the projectile out of the explosive containment room (ECR), where the munition is loaded onto a tray, and conveyed to the munitions washout station (MWS). The nose closure and miscellaneous components are placed on a munition tray for processing in the metal parts treater (MPT). Bursters are transferred to the EBH for deactivation by hydrolysis.

Nose Closure Removal System: Equipment includes a nose closure removal (NCR) station and NCR projectile transfer robot. The removal of nose closures from unburstered projectiles (GB and VX) is accomplished by unscrewing the nose of the projectile in the nose closure removal system (NCRS). Once nose closures are removed from the projectiles, the projectiles are transferred on a munition tray to the munition washout station (MWS). Removed nose closures are processed in the MPT.

Munitions Washout System: Equipment includes MWS weight scale, MWS projectile transfer robot, three (3) cavity access machines (CAM) – two (2) operating and one (1) standby, nine (9) gallon/minute agent washout pump, two (2) gallon/minute drained agent pump, nine (9) gallon/minute drained agent/agent washout pump, nine (9) gallon/minute water jet pump and spare, six hundred (600) gallon working capacity washout water storage tank, thirty (30) gallon working capacity agent washout surge drum, five (5) gallon working capacity drained agent surge drum and ninety-seven (97) MBTU/HR washout water storage tank heater. In the MWS, the agent cavity of the projectile is accessed, free liquid agent is drained, and the agent cavity is washed out with high-pressure water. After the cavity is flushed, the projectile is placed on the munition tray upright (nose up) and transferred to the MPT.

Agent Collection/Toxic Storage: Equipment includes twenty-five (25) gallon/minute wash water agent pump and spare, five (5) gallon/minute agent concentrate pump and spare, one thousand (1,000) gallon working capacity agent settling tank, ten (10) gallon/minute agent concentrate feed pump and spare, agent concentrate holding tank agitator, five hundred (500) gallon working capacity agent concentrate holding tank that accumulates agent prior to treatment in the ANS, twelve (12) gallon/minute agent feed pump and spare and one thousand (1,000) gallon working capacity agent surge tank.

SOURCE DESCRIPTION (CONTINUED):

Agent Neutralization: Equipment includes four hundred-thirty (430) gallon/minute agent hydrolyzer recirculation pumps and spares (one/hydrolyzer), two (2) MMBTU/HR agent hydrolyzer heat exchangers (one/hydrolyzer), agent hydrolyzer agitators (one/hydrolyzer), two (2) agent hydrolyzers (78" ID x 120" TT), 2000 BTU/HR agent hydrolyzer vent condenser (one/hyrolyzer), agent hydrolysate sampling tank agitators (one/sampling tank), three (3) four thousand-eighty (4,080) gallon working volume agent hydrolysate sampling tanks and two (2) two hundred-four (204) gallon/minute agent hydrolysate pumps and spares. The agent hydrolyzers neutralize collected CA and CA-contaminated washwater from the MWS and RSM by hydrolysis. Hydrolysis is a liquid-phase process, operated at 90˚ to 95˚C (near but below the boiling point of the solution). During the hydrolysis process, the CA or CA-contaminated material is mixed in an enclosed vessel with hot water or hot caustic (NaOH). The CA is destroyed by the chemical reaction. Reaction products are tested for CA; if the concentration is below the target release level, the hydrolysate is transferred to the hydrolysate storage tanks. If not, the hydrolysate is further treated until the CA concentration is below the target release level.

Spent Decontamination System: Spent Decontamination Solution (SDS) System collects SDS that is generated during plant operations. Equipment includes twenty (20) gallon/minute category A sump pump, twenty (20) gallon/minute category B sump pump, twenty (20) gallon/minute category C sump pump, spent decon holding tank agitator (one/holding tank), three (3) six thousand-five hundred (6,500) gallon working capacity holding tanks that accumulate SDS prior to treatment in the ANS, fifty (50) gallon/minute spent decon feed pump and spare and one hundred-sixty (160) gallon spent decon feed pump and spare.

Metal Parts Treatment: Equipment includes MPT inlet airlock/conveyors (W 6'-6", H 6'-6", L 10'-10", one/line), MPT outlet airlock/conveyors (W 6'-6", H 6'-6", L 10'-10", one/line), metal parts treater (6'-6" ID X 18'-4" L, one/line), eighty-eight (88) MBTU/HR MPT steam superheater (one/line), thirty-one (31) MBTU/HR steam superheater (one/line), and MPT cyclone (16" OD X 66" H, one/line). In the MPT, metal projectile parts and other miscellaneous contaminated metal solids (e.g., banding from pallets that were exposed to agent) are decontaminated by being heated to a minimum of 1,000˚F for 15 minutes in the electrically heated MPTs. The decontaminated metal parts are shipped offsite for either recycling or proper disposal.

Metal Parts Treatment Decontamination System: Equipment includes two (2) one thousand-four hundred (1,400) gallon working capacity MPT condensate holding tanks – tanks vent to room and are equipped with carbon filters for odor control, MPT condensate holding tank agitators (one/tank), seventy-five (75) gallon/minute MPT condensate feed pump and spare.

Energetics Batch Hydrolyzer: The EBHs neutralize the energetics in the segmented rocket parts and the projectile bursters from the RSM and PMD by hydrolysis. During the hydrolysis process, the energetics are mixed in a vessel with caustic (NaOH). Any energetics are deactivated and trace CA is destroyed by the chemical reaction. If not, the hydrolysate is further treated until the CA concentration is below the target release level. After treatment in the EBHs, the solid components of the rockets (fiberglass and steel) are sent to a heated discharge conveyor. Liquid goes to the energetics neutralization reactors (ENRs) for further treatment.

SOURCE DESCRIPTION (CONTINUED):

Energetics Batch Hydrolyzer (Continued): Equipment per train includes eight (8) thirty-two (32) gallon/minute secondary cooling loop pumps, three and two hundredths (3.02) MBTU/HR caustic heater, blast gate, eight (8) energetics batch hydrolyzers (operating volume = eight hundred thirty-six (836) gallons, maximum volume = one thousand five hundred seventy-five (1,575) gallons), one thousand two hundred (1,200) gallon hydrolysate collection tank, mechanical conveyor (93' L X 30" W X 15" H), thirty (30) gallon/minute hydrolysate transfer pump and spare, seventy thousand (70,000) BTU/HR secondary cooling loop heat exchanger, parts lift (904 lb/cycle), eight (8) six hundred forty-nine thousand (649,000) BTU/HR secondary cooling loop heat exchangers, heated discharge conveyor (HDC) (6' H X 6' W X 80' L), cooled discharge conveyor (2' W X 80' L), three and one-half (3.5) gallon/minute secondary cooling loop pump, HDC size reduction (734 lb/hr), screw conveyor (734 lb/hr), a second blast gate, eight (8) six hundred forty-nine thousand (649,000) BTU/HR condensate coolers, RSM robot (364 lb/min capacity), rail robot 1 (364 lb/min capacity), slide gate (2' X 3'), eight (8) three hundred fifty-six (356) gallon condensate tanks, eight (8) thirty (30) gallon/minute condensate pumps, intermediate transfer robot (364 lb/min capacity) and rail robot 2 (364 lb/min capacity).

Energetics Neutralization Reactors: The energetics hydrolysate further reacts in the ENRs to assure deactivation of the energetics and destruction of the CA. The energetic hydrolysate is sampled and analyzed for CA. Equipment per train includes three (3) two and eighty-eight hundreths (2.88) MMBTU/HR heat exchangers, three (3) energetics neutralization reactor (ENR) agitators, three (3) four thousand seven hundred eighty-five (4,785) gallon working capacity energetics neutralization reactors (8'-6" ID X 11'-6" TT), and three (3) two hundred forty (240) gallon/minute ENR recirculation pumps, each equipped with a spare. If the CA concentration is below the target release level, the hydrolysate is transferred to the hydrolysate storage tanks. If not, it is further treated until the agent concentration is below the target release level.

Emission Units CD02 and CD03 are each a single thirty-four and one half (34.5) MMBTU/HR process heat boiler. These boilers are natural gas fired units that will use distillate oil as a backup fuel if natural gas is not available.

Emission Units CD04 and CD05 are each a single thirty-seven and three tenths (37.3) MMBTU/HR space heat boiler. These boilers are natural gas fired units that will use distillate oil as a backup fuel if natural gas is not available.

Emission Units CD06 – CD09 are each a single standby diesel generator rated at twenty-nine and one half (29.5) MMBTU/HR (fuel input) and four thousand six hundred forty (4,640) hp power output. These generators supply electricity to critical operations and safety equipment when the power supply to the facility is interrupted.

Emission Units CD10 and CD11 are each a single standby diesel generator rated at six and seven tenths (6.7) MMBTU/HR (fuel input) and one thousand fifty-five (1,055) hp power output. Emission Unit CD10 (EG5) is installed next to the MDB HVAC filter system. It provides an additional level of redundancy to maintain draft in the MDB if the primary SDGs do not start or if a problem arises in the power distribution system. Emission Unit CD11 (EG6) is installed near the water storage tanks. If power is interrupted, it provides backup power to critical process water pumps and for emergency fire fighting water.

COMMENTS:
The emissions from emission unit CD01, the MDB are controlled by the following equipment:

Metal Parts Treatment, Offgas Treatment System (OTS): Equipment includes two (2) one and forty-four hundreths (1.44) MMBTU/HR air heaters, two (2) metal parts treater (MPT) pre-catalytic treatment units (3'-10" OD X 20'-0" H), two (2) MPT CATOX units (2'-5" X 2'-5" X 4'-0"), MPT venturi/scrubber tower (venturi section: 2'-9" OD X 11'-10" H, Sump: 9'-11" H, Tower: 6'-0" ID X 27'-0" F/F), eight (8) MMBTU/HR MPT scrubber recirculation cooler, one thousand five hundred (1,500) gallon working capacity MPT scrubber recirculation surge tank, one hundred twenty-five (125) gallon/minute MPT venturi recirculation pump and spare, two hundred-fifty (250) gallon/minute MPT scrubber recirculation pump and spare, filter (1'-4" W X 1'-4" H X 8" L), ninety-seven (97) hp, five thousand nine hundred thirty-four (5,934) ACFM blower and spare and twenty and one tenth (20.1) MBTU/HR air reheater. The ANR and the MPT vent to the MPT OTS. The CO emission rate from the MPT is estimated by calculations using Aspen modeling. A destruction efficiency of 90% is assumed for CO in the catalytic oxidizer system of the OTS. The NO_X emission rate from the MPT is estimated by calculations using Aspen modeling.

EBH/ENR OTS: Equipment per train includes one-twentieth (0.20) MMBTU/HR HDC flue gas condenser, seventy-one hundredths (0.71) MMBTU/HR HDC flue gas heater, HDC flue gas CATOX unit (1'-6" H X 1'-6" W X 1'-9" L), EBH venturi (7'-0" ID X 13'-6" H), EBH scrubber tower (10'-3" ID X 28'-0" T/T), four hundred thirty-eight (438) bhp, three thousand three hundred thirty-eight (3,338) ACFM EBH blower and one common spare, twelve and ninety-two hundredths (12.92) MMBTU/HR EBH scrubber recirculation cooler, EBH offgas filters, four thousand five hundred (4,500) gallon working capacity EBH scrubber recirculation surge tank, nine hundred (900) gallon/minute EBH scrubber recirculation pump and spare, eighty-one hundredths (0.81) MMBTU/HR air reheater, fifty-two thousandths (0.052) gallon/minute HDC flue gas condensate pump and spare. All processing equipment of the EBH, ENR, and HDC, as well as their ancillary equipment, vent to the EBH/ENR offgas treatment system (OTS).

Dunnage Shredding and Handling System (DSH): The shredder, grinders, micronizer, hydropulper, and other processing equipment associated with dunnage shredding and handling (DSH) vent to a baghouse.

MDB HVAC Filter System: In the MDB, all emissions pass through the MDB heating ventilating, and air conditioning (HVAC) filter system and are released through two stacks (MDB1 and MDB2). The offgases from the EBH/ENR OTS, MPT OTS, and the DSH baghouse vent to the MDB HVAC filter system before they are released to the atmosphere, as does all of the ventilating air in the MDB. The MDB HVAC filter system serves a fourfold purpose:

1. Capture and contain agent vapor from the mechanical processing, and washing of the munitions (which includes accessing, draining, and washing the agent cavity of the rockets and projectiles) by maintaining a negative pressure environment in the MDB.

2. Control agent contamination by maintaining the flow of air from areas of low contamination probability to areas of higher contamination probability.

3. Remove agent vapors from the exhaust before it is discharged to the atmosphere.

4. Provide a controlled environment for human comfort and equipment performance.

COMMENTS (CONTINUED):

The release or spread of contamination is prevented by cascaded pressure control. This arrangement ensures a flow of air from the areas with the least agent contamination to the areas with the most contamination in the MDB and ensures containment within the MDB. To minimize the spread of contamination and maintain the toxic boundaries, the number of air changers per room is higher for areas likely to be contaminated. Airflow is controlled by the following means:

1. Modulating the supply air into the building.
2. Modulating the exhaust flow of air out of the building.
3. Setting weighted dampers throughout the building.

The MDB HVAC filter system consists of sixteen (16) modules in parallel with a combined design airflow of 256,000 ACFM (16,000 ACFM per filter unit). In addition, two units are maintained on standby in case one unit must be removed from service for maintenance. Dampers are provided to isolate any unit for maintenance. These dampers are designed to maintain draft within the isolated unit through the other operating filters to prevent the release of contaminants during maintenance. Drawing 24915-08-M5-HVAC-00001 in the BGCAPP CAA application shows the process flow diagram for one bank of nine filter units (8 operating and one spare) of the HVAC filter system.

Each filter unit has an independently operating fan. To maintain negative pressure in the MDB, up to four primary standby diesel generators (SDGs) maintain power to the MDB HVAC filter fans as well as other essential loads during commercial power outages. A fifth secondary SDG will be installed to maintain negative pressure in the MDB if the primary SDGs do not start or if a problem arises in the power distribution system.

Each MDB HVAC filter unit consists of the following components (see Dwg. 24915-08-M5-HVAC-00001):

1. One particulate prefilter (HIGH)
2. One high-efficiency particulate air (HEPA) filter
3. Six carbon filter banks in series (CHAR)
4. One final HEPA filter

The particulate matter (PM) emission rate for the MDB filter system is based on an assumed outlet grain loading of 0.001 grain/acf. This assumption is based on the fact that all air has passed through multiple air pollution control devices, including two layers of HEPA filters. This assumption results in a PM emission rate of 2.19 lb/hr and a maximum annual emission rate of 9.6 tons/yr based on an operating schedule of 24 hr/day, 365 days/yr. The particulate matter with a diameter of less than 10 μm (PM_{10}) emission rate for the MDB HVAC filter stacks is assumed (as a worst-case) to be the same as the PM emission rate.

The total hydrocarbon (THC) emission rate from the MDB filter system is based on an assumed worst-case inlet loading of 10 ppm THC into the MDB HVAC filters. This assumption is a worst-case scenario based on the following characteristics of the design:

1. All sources of THC are controlled by one of the OTSs.
2. The DSH is a mechanical size reduction and slurrying system and does not produce THC.
3. The majority of the gas processed through the MDB HVAC system consists of ambient air from the MDB. No processes in the MDB release THC directly to the air.

COMMENTS (CONTINUED):

The air flows through six activated carbon banks, each of which corresponds to an adsorber. The adsorption efficiency of the carbon adsorption units is calculated based on the EPA's report *Preferred and Alternative Methods for Estimating Air Emissions From Surface Coating Operations*. This report was prepared for EPA under the Emission Inventory Improvement Program. It is available from the U.S. EPA Air Chief Website at http://www.epa.gov/ttn/chief/eiip/techreport/volume02/ii07_july2001.pdf. Table 7.2-2 of this document specifies that the minimum volatile organic compound (VOC) removal efficiency for each adsorber be 90%. At this minimum removal efficiency for each adsorber, the six adsorbers in series result in a calculated removal efficiency of 99.9999%.. The hazardous air pollutant (HAP) emission rate is assumed to be equal to the THC emission rate.

The MDB filter system is an integral part of the demilitarization process; the filter system will always be in operation during the life of the facility.

COMMENTS (CONTINUED):

TABLE 1 – ESTIMATED EMISSION RATES OF CRITERIA POLLUTANTS AND HAPS FROM THE MDB

EIS No.	Throughput (tons/hour)	Pollutant	Control Equipment	Control Efficiency (%)	Emission Factor (lb/ton)	Emissions (lb/hour)	PTE (tpy)
CD01	15.43	CO	Catalytic Oxidizer	90.00%	4.33	6.68	29.26
		NO_X		TBD	0.006	0.09	0.41
		PM/PM_{10}	HEPA Filter	99.00%	14.22	2.19	9.61
		VOC	Activated Carbon Adsorption	99.9999%	0.77	1.1881E-05	5.2E-05
		HAP	Activated Carbon Adsorption	99.9999%	0.77	1.1881E-05	5.2E-05

The applicable regulations to emission unit 23 are 401 KAR 59:010 and 401 KAR 63:020. Emission unit 23 is subject to 401 KAR 59:010 due to the particulate matter emissions. The allowable emission rate for particulate matter is determined using the equation specified in Appendix A of 401 KAR 59:010, E = 3.59*P^(0.62). In this equation "P" is equal to the maximum process input weight rate (tons/hour) of rockets, projectiles, dunnage and reagent. "E" is equal to the allowable emission rate in pounds/hour. "P" is equal to fifteen and forty-three hundredths (15.43) tons as specified in the BGCAPP CAA application. The resulting allowable emission rate is nineteen and fifty-eight hundredths (19.58) lb/hr. As mentioned previously the estimated particulate matter emission rate taking into account air pollution control equipment will be 2.19 lb/hr. Compliance with the allowable emission rate is assumed when the MDB HVAC filter system is operational.

COMMENTS (CONTINUED):

401 KAR 63:020 is also applicable because of emissions of potentially hazardous matter and toxics substances. The emission rate of any pollutant shall not be such that the concentration of that pollutant at the BGAD property boundary exceeds health-based standards recommended by the EPA-OAQPS or the general population limit (GPL) for any chemical agent (CA) recommended by the Centers for Disease Control and Prevention (CDC). Section I of permit V-05-034 requires the submittal of an operating plan eighteen (18) months prior to beginning demilitarization operations. The operating plan must establish the types of potentially hazardous matter and toxic substances that will be emitted from the MDB and the rate at which they will be emitted. The emissions will be modeled using an EPA approved air dispersion model for the purpose of determining their concentration at the BGAD property boundary. If the concentration of a potentially hazardous matter or toxic substance is found to exceed the EPA-OAQPS or CDC standard, then the permittee must take action to reduce or eliminate the emissions of that substance from the MDB stack.

The emissions of criteria pollutants from natural gas combustion from emission units CD02 – CD05 are calculated using emission factors from AP-42, 5th Edition, Tables 1.4-1 (2/98) and 1.4-2 (7/98). The emissions of criteria pollutants from distillate oil combustion from emission units CD02 – CD05 are calculated using emission factors from AP-42, 5th Edition, Tables 1.3-1 (9/98), 1.3-2 (9/98), 1.3-3 (9/98) and 1.3-6 (9/98). The current total heat input for all indirect heat exchangers greater than one (1) MMBTU/hour at BGAD is fifty-four and sixty-nine hundredths (54.69) MMBTU/hour. The BGCAPP will add one hundred forty-three and fifty-two hundredths (143.52) MMBTU/hour of heat input. The new total heat input for all indirect heat exchangers at BGAD will be one hundred ninety-eight and twenty-one hundredths (198.21) MMBTU/hour. The allowable emission rate of particulate matter (PM) for emission units CD02 – CD05 is determined according to 401 KAR 59:015, Section 4(1)(c). The allowable emission rate of PM = 0.9634(198.21)^(-0.2356) = 0.2771 lb/MMBTU actual heat input. The allowable emission rate of sulfur dioxide (SO_2) for emission units CD02 – CD05 is determined according to 401 KAR 59:015, Section 5(1)(c). The allowable emission rate of SO_2 = 7.7223(198.21)^(-0.4106) = 0.8801 lb/MMBTU actual heat input. The allowable emission rate of SO_2 required by Subpart Dc, Section 60.42c(d) is 0.50 lb/MMBTU heat input; or as an alternative, no owner or operator of an affected facility that combusts oil shall combust oil in the affected facility that contains greater than five tenths (0.5) weight percent sulfur. The SO_2 emission limit required by Subpart Dc (either 0.50 lb/MMBTU or sulfur content of fuel oil less than or equal to 0.5 weight percent) is more stringent than the SO_2 emission limit required by 59:015 and therefore are the limits listed in the permit. Emission units CD02 and CD03 are subject to an operating limitation of 220,550 gallons of distillate oil per year per boiler. Emission units CD04 and CD05 are subject to an operating limitation of 238,194 gallons of distillate oil per year per boiler. These operating limitations are based on operating ten (10%) of the potential operating hours or 876 hours.

The emissions of criteria pollutants from emission units CD06 – CD09 are calculated using emission factors from manufacturer data. These emergency generators are equipped with urea selective catalytic reduction. Emissions of criteria pollutants are calculated using the following control efficiencies as specified by the manufacturer: 70% for CO, 90% for NO_X, 70 % for PM, 0.0% for SO_2 and 70% for VOC.

The emissions of criteria pollutants from emission units CD10 and CD11 are calculated using emission factors from AP-42, 5th Edition, Tables 3.4-1 (10/96) and 3.4-2 (10/96).

EMISSION AND OPERATING CAPS DESCRIPTION:

Emission Unit CD01, Operating Limitation (B):

In the Kentucky Division of Waste Management (DWM), Research Development and Demonstration (RD&D) Permit, Permit Number KY8-213-820-105, Part II – Specific Condition T-11, requires that monitoring data from the facility reflect no confirmed detectable agent emissions from the Munitions Demilitarization Building (MDB) HVAC filters, and the Laboratory HVAC filters.

Public laws 91-121 (1970), 91-141 (1971), and 91-145 (1986) require that the Department of Health and Human Services (DHHS) provide public health review and oversight of the Department of Defense's plans and activities to test, transport, and dispose of chemical and biological weapons. This responsibility has been delegated to the Centers for Disease Control and Prevention (CDC), which is an agency within DHHS.

The CDC has established recommended Airborne Exposure Limits (AEL) for chemical agents. The RD&D Permit that will be issued by the Division of Waste Management will address the monitoring requirements associated with MDB HVAC filters and Laboratory HVAC filters. These requirements will be contained in the following documents: **Procedures to Prevent Hazards** and **Waste Analysis Plan**. The submittal of these documents as specified in the compliance schedule of the RD&D permit is twelve (12) months prior to the receipt of hazardous waste and eighteen (18) months prior to the receipt of hazardous waste respectively. These requirements shall be reflected in the Operating Plan that is required by the Compliance Schedule in Section I of Permit Number V-05-034, (12) twelve months prior to the beginning of demilitarization operations. The Division of Air Quality (DAQ) may request additional information beyond what is specified in these documents for the purpose of assuring compliance with 401 KAR 63:020.

Table 2 lists the Interim Airborne Exposure Limits for Chemical Warfare Agents H and HD (sulfur mustard) as published in the Federal Register on May 3, 2004. Table 3 lists the Final Recommended Airborne Exposure Limits for GA, GB and VX as published in the Federal Register on October 9, 2003. These tables are presented here so as clearly reference the source of the General Population Limits which are listed in Table 4. In regard to the chemical agents GB, H and VX compliance with 401 KAR 63:020 will be assured so long as the most up to date General Population Limits as specified by the CDC are not exceeded at the BGAD property boundary.

EMISSION AND OPERATING CAPS DESCRIPTION (CONTINUED):

Department of Health and Human Services, Centers for Disease Control and Prevention, Interim Recommendations for Chemical Warfare Agents H and HD (Sulfur Mustard) as published in the Federal Register. (FEDERAL REGISTER / VOL. 69, NO. 85 / MONDAY, MAY 3, 2004 / NOTICES)

TABLE 2 – CDC RECOMMENDED INTERIM AIRBORNE EXPOSURE LIMITS *

[All values expressed as mg/m^3 in air with concentration x time [Ct – mg – min/m^3] values in parentheses]

Sulfur mustard (H, HD[†]) criteria	General population limit	Worker population limit	Short-Term exposure limit[‡]	Immediately dangerous to life or health [§]
Exposure Level	0.00002 (0.01)	0.0004 (0.19)	0.003 (≤0.04)	0.7 (≤21)
Averaging Time	12 hours	8 hours	≤15 minutes	≤30 minutes
Recommended Monitoring Method	Historic[§§]	Historic[§§] or Near-real-time.	Near-real-time.	Near-real-time.

*Although CDC does not specifically recommend additional reduction factors for statistical assurance of action at the exposure limit, exposures to sulfur mustard should be minimized given the uncertainties in risk assessment, particularly as related to characterizing carcinogenic potency.

[†] The toxicity data for agent T is inadequate for setting exposure limits. The very low vapor pressure for agent T precludes it as a vapor hazard under normal ambient conditions. For sulfur mustard and T mixtures, air monitoring for sulfur mustard alone should be sufficient under most circumstances to prevent exposure to T.

[‡]To be evaluated with near-real-time instrument using shortest practicable analytic cycle time. No more than one exposure per work-shift.

[§]The 30-minute period is not meant to imply that workers should stay in the work environment any longer than necessary; in fact, they should make every effort to exit immediately. IDLH conditions require highly reliable dermal and respiratory protection.

[§§]Historic monitoring typically is used for time-weighted average (TWA) monitoring where the sample analyzed represents an extended time period, *e.g.,* 8 or 12 hours. Results are not known until laboratory analysis is completed after the sampling event. AELS using historic monitoring are set at levels at which health effects are not expected to occur for most workers. Exposures above the WPL-8, but below the STEL, likewise are not expected to result in significant health effects unless such exposures occur continuously for long periods.

EMISSION AND OPERATING CAPS DESCRIPTION (CONTINUED):
Department for Health and Human Services, Centers for Disease Control and Prevention, Final Recommendations From Potential Adverse Effects of Exposure to Agents GA (Tabun), GB (Sarin), and VX. (FEDERAL REGISTER / VOL.68, NO. 196 / THURSDAY, OCTOBER 9, 2003 / NOTICES)

TABLE 3 – FINAL RECOMMENDED AIRBORNE EXPOSURE LIMITS (AELS) FOR GA, GB, AND VX

AEL (mg/m^3)	General Population Limit (GPL)*	Worker Population Limit (WPL)*	Short-Term Exposure Limit (STEL)*	Immediately Dangerous to Life or Health (IDLH)
GA, GB	1×10^{-6}	3×10^{-5}	1×10^{-4}	0.1
VX	6×10^{-7}	1×10^{-6}	1×10^{-5}**	0.003
Averaging Time	24 hours	8 hours	15 minutes	≤30 minutes
Monitoring Method for Recommended Exposure Criteria	Historical monitor***	Historical monitor	Near-real-time monitor	Near-real-time monitor

***** An additional reduction factor for statistical assurance of action at the exposure limit is not needed because of safety factors already built into the derivation of the exposure limit.

** VX STEL has been adjusted from 4×10^{-6} mg/m^3 (up to four times per day) as proposed in the **Federal Register** announcement to 1×10^{-5} mg/m^3 (not more than one time per day) based on technical capabilities of existing air-monitoring technologies.

*** Historical monitoring typically refers to long-term sampling and analytical methods. Air-monitoring results from historical methods are not known until laboratory analyses are complete.

EMISSION AND OPERATING CAPS DESCRIPTION (CONTINUED):
Emission Unit CD01, Operating Limitation B – 401 KAR 63:020, Potentially Hazardous Matter or Toxic Substances, Compliance Requirements

TABLE 4 –COMPLIANCE CRITERIA FOR LETHAL NERVE AGENT GB, BLISTER AGENT H/HD AND LETHAL NERVE AGENT VX

Chemical Agents to be destroyed at the BGCAPP	GB	H/HD	VX
General Population[§] Limit (mg/m^3)	1×10^{-6}	2×10^{-5}	6×10^{-7}
Averaging Time	24 hours	12 hours	24 hours
Recommended Monitoring Method	Historical Monitor*	Historical Monitor**	Historical Monitor*

[§]As of issuance of permit V-05-034, these are the current recommend General Population Limits. The most up to date General Population Limits shall serve as the compliance criteria for 401 KAR 63:020.
*Historical monitoring typically refers to long-term sampling and analytical methods. Air-monitoring results from historical methods are not known until laboratory analyses are complete.
**Historic monitoring typically is used for time-weighted average (TWA) monitoring where the sample analyzed represents an extended time period, *e.g.*, 8 or 12 hours. Results are not known until laboratory analysis is completed after the sampling event.

EMISSION AND OPERATING CAPS DESCRIPTION (CONTINUED):

Emission Unit CD01, Operating Limitation (C):

The permittee shall submit an Operating Plan eighteen (18) months prior to beginning demilitarization operations. The operating plan shall specify the method(s) by which the emissions of potentially hazardous matter and toxic substances are determined. The source shall model these emissions using an EPA approved air dispersion model. The concentrations of the potentially hazardous matter and toxic substances at the BGAD property boundaries must be less than the most up to date health based standards recommended by the EPA, Office of Air Quality Plan and Standards (OAQPS). The current health based standards recommended by the EPA-OAQPS are the prioritized chronic dose-response values located at http://www.epa.gov/ttn/atw/toxsource/table1.pdf and the acute dose-response values located at http://www.epa.gov/ttn/atw/toxsource/table2.pdf.

The units for cancer risk in Table 1 are $1/(\mu g/m^3)$. This is referred to as unit risk. The unit risk must be converted into a concentration so that it can be compared with modeled ambient concentrations. Unit risk can be converted into concentration using the following methodology:

Let us define the term "Maximum Allowable Emission Level" x unit risk (from Table 1) = cancer risk.

Maximum Allowable Emission Level (MAEL) = risk / unit risk

The acceptable "target risk" for cancer endpoints is one-in-one million (10^{-6}) (unit-less)

MAEL ($\mu g/m^3$) = (1×10^{-6}) / unit risk

This is the value that should be compared to the modeled concentration of a pollutant.

The acceptable "target risk" for non-cancer endpoints is a hazard index of 1 or less, where hazard index is defined as:

$$Hazard\ Index = \frac{Modeled\ Concentration\ of\ X}{Concentration\ of\ X\ in\ Table}$$

The source is subject to an emission cap of 90.0 tons per year for VOC, 9.0 tons per year for single HAP, 22.5 tons per year for combined HAP, 225.0 tons per year for CO and 225.0 tons per year for NO_X. By taking these limits the source will preclude the applicability of 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants, Subpart GG (Aerospace Manufacturing and Rework Facilities), 40 CFR Part 63, 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants, Subpart DDDDD (Industrial, Commercial, and Institutional Boilers and Process Heaters), 401 KAR 59:225, New miscellaneous metal parts and products surface coating operations and 401 KAR 51:017; Prevention of significant deterioration of air quality.

PERIODIC MONITORING:
The permittee shall submit an Operating Plan not less than twelve (12) months prior to beginning demilitarization operations. The Operating Plan shall specify the method(s) by which emission rates of potentially hazardous matter and toxic substance from MDB HVAC filters shall be established. At a minimum the Operating Plan shall specify the testing, monitoring, record keeping and reporting requirements sufficient to demonstrate compliance with the operating limitations specified in this permit and all Division of Waste Management Requirements.

CREDIBLE EVIDENCE:
This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.